Issue 27
November 2019

Utah Valley Amateur Radio Club

The UVARC Shack

Powering ahead through Fall

Jared Naser (left) and Andy Neff (owner) of Interstate Batteries team up to explain current battery types available for portable use, usage tips, and what's on the horizon for new battery technology. Just like last time, due to the huge amount of interest, they drew our largest-ever crowd.

In this issue of the *UVARC Shack*

We honor yet another silent key, WE7NYU. Also included are the club election results.

Brass Tacks tells us what a tuner does for you. *The Amateur in You* explains the role of the ERC and how you can help, plus how to avoid the dreaded Geezer Complex.

Dear Annette answers a question about why we amateurs are licensed. Discussion in *Hot Tips* on setting up a remote station. *DIY* features a roll-up 6-meter vertical dipole antenna.

Please send your ideas, stories, questions, gripes, and photos to ***uvarcshack@gmail.com***

Inside this issue

Elections and October Club Meeting	2
Silent Key	3
Events	4
Brass Tacks	5
Dear Annette	8
DIY	12
Living in the Past	14

Other points of interest

- *The Amateur in You* 9, 10
- *Hot Tips* 11
- *Side of Bacon* 15
- *For Your Insight, Lynx* 16
- *Questions of the Month* 16
- *Upcoming Contests, Regular Nets* 17
- Ham radio exam sessions / courses 17
- Who we are 19

Club meetings

Recap

Election 2019 results

Not very many surprises at our annual election. All elected positions remained intact, except Activities, where James Brown W7JHB served faithfully and well during this past year. Our newly elected Activities leader is Board member Wendy Shoop KW3NDY, and we welcome her to the UVARC presidency.

October 2019 Club Meeting

As shown on the front cover, we had a well-attended and terrific presentation by two very knowledgeable gentlemen from Interstate Batteries.

Brent says he never wins anything

Corey takes home the one-year ARRL membership

Silent Key

Memorial for a member who has passed on

Ed Huebner, WE7NYU

Many of us mourn the passing of yet another friend, Ed WE7NYU. Here are a few words about Ed:

Ed was a kind, generous person who loved his wife Barb, his dogs Samson and Muffy, and friends. Ed was the type of person to tell you like it is; he would not lie to you or beat around the bush. Ed loved the Chicago Cubs and talking to his friends as a ham radio operator. He was a good son to his parents, Edward Sr. and Marie, and sister Diane, all three of whom preceded him in death. It's comforting to know that he's been reunited with them and out of pain. — David Boerner, PG

After meeting over the air, Ed joined the 76ers in 2011. He was very enthusiastic about life, and enjoyed a variety of interests. Ed and Barbara asked me many questions about the (LDS) Church. We spoke at length on the phone, often for hours at a time. When his interest in the Church really took off, we decided that Thomas KF7ZTM would continue helping Ed and Barbara with the Gospel, since Thomas lived in their ward boundaries. Missionaries were brought in, and they were eventually baptized into the Church.

With wife Barbara at the gravesite

Pallbearers included Carl WE7OMG and Doug W7GPD

Friends at Ed's baptism included Richard K7KGK, Lon WE7LDS, Carl WE7OMG, and Von K7VMH

— Richard Heward K7KGK

And finally, from Ed's wife Barbara:

In loving memory of Edward L. Huebner, my precious husband. The sweetest gift is knowing where you are. Love and miss you.

— Your loving wife, Barbara J. Huebner

73 and rest in peace, Ed.

Events

Upcoming happenings

Utah Valley Hamfest 2020

The Utah Valley Hamfest 2020 is looming around the corner. It's an ARRL State Convention and a gathering of amateur radio enthusiasts from Utah and surrounding states. The *Utah Valley Hamfest 2020*, sponsored by the Utah Valley Amateur Radio Club, will be held on Friday May 8 and Saturday May 9, in the UCCU Center of Utah Valley University (UVU), 800 W University Pkwy in Orem. Entry fee is $30, or $40 per family. The purpose of a hamfest is to host seminars, breakouts, demonstrations, keynote speakers, vendors, small activities (build-it, fox hunt, HT programming, etc.), and door prizes, bringing hams face-to-face from all over. But this hamfest will also provide the following:

- Kiosks such as *The Doctor is In* (get answers to difficult technical or political questions), *The Handyman* (get an Anderson connector installed, have some wires soldered, let us attach a PL-259 to your coax, etc.), and *Elmer Fudd*® (your new best friend)
- Ham Anon seminar, for spouses of those addicted to ham radio
- Information on many aspects of amateur radio, including HF, digital, emergency, APRS, ARES, CW, SOTA, portable, satellites, EME, remote, and much more
- Exposure to many aspects of amateur radio not otherwise seen in club meetings and swap meets
- Special Event Station K7T to draw attention to the hamfest and get you on the air

The website for the Hamfest is utahvalleyhamfest.com. This will be fun!

We're looking for volunteers and helpers, especially from those who have talents in some specific areas, such as graphic arts, embroidering, RF technology, programming, logistics, antenna building, and more. If you'd like to help out, or at least be part of the planning and organizing, please contact us at info@utahvalleyhamfest.com or 801-368-1865.

UVARC November 2019 DIY Night

In the November 2018 club meeting, we held a DIY (do-it-yourself) night, with a twist. That is, instead of everybody working on a single project, we had a few different projects and skills for attendees to get involved with. This month's DIY Night, however, we've taken your feedback from last year's meeting, and we'll step it up a notch. One of the biggest drawbacks last year was that we didn't involve as many of you as wanted to get your hands dirty. So, this year we're going to put out more tables, and bring more soldering irons, and more coaxial cable, and provide more tools. Furthermore, we'll also have more things for you to do!

We plan to set up tables for you to learn or brush up on

- soldering
- heat-shrinking
- zip-tying
- radio programming
- coax connector installation
- Anderson Powerpole installation
- HF station setup
- dissecting a VHF antenna installation

and much more! Please come and enjoy the time together, 6:30 pm this Thursday at the Orem City Council Room, 56 N State St.

Brass Tacks

An in-depth look at a radio-related topic

Tuners

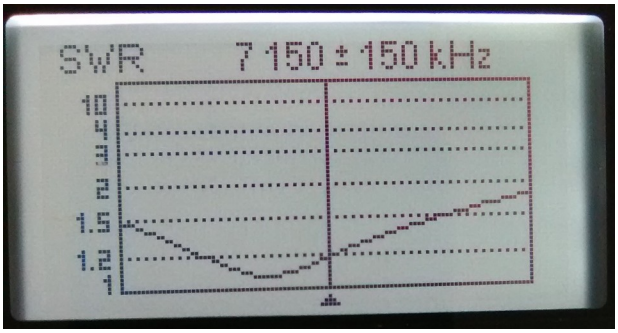
Many who get into amateur radio will never get involved with HF (high frequency, or about 1.8 to 30 MHz), and that's simply a matter of personal preference. Those who do, however, find a whole new world of challenges awaiting them, mostly technical. One of these challenges is getting their HF radios to work favorably with their antennas, whether they purchase the antennas from stores or they build them at home.

Whether you're working with HF, VHF (very high frequency, or about 30 to 300 MHz), or UHF (ultra high frequency, or about 300 to 3000 MHz), antenna construction allows for quite a lot of assembly-time tolerances. In other words, they don't all arrive at your doorstep set with the exact right dimensions or adjustments required for proper operation on your desired frequencies. Because of that, you're often required to *tune* your antenna for the best possible performance on the band(s) of interest.

Still, even after all the cutting, bolting, and modifying you make on an antenna, its best-performing frequency range might not be close enough to your target for satisfactory operation, as determined by your *analyzer*. For this situation, you can purchase a *tuner*, if one isn't already built into your transceiver. So, just what does a tuner tune, and how does it work? Rather than quote a bunch of theory, I thought this is better explained by a few examples.

The matched case

Your transceiver is connected by 100 feet of 50-ohm RG-8X coax to a *near-perfectly tuned* 40-meter antenna, meaning its SWR is very close to 1.0:1 within that band. You set your transceiver to transmit at 100 watts, and key up, screaming into your mic (no audio means no power out, and loudest audio means full power out.) The 100 feet of RG-8X will attenuate (reduce) your 40-meter signal by 1.0 dB, or about 20 %, meaning about 80 watts will reach the antenna. And because the antenna impedance (50 ohms) matches that of the coax (transmission line), all 80 watts of the remaining signal will be sent into the air, the best possible outcome.



Not quite a perfect match, but pretty good

The mismatched case

Your transceiver is connected by 100 feet of 50-ohm RG-8X coax to a *poorly tuned* 40-meter antenna, such that its SWR is about 5.4:1 within that band. You set your transceiver to transmit at 100 watts, and key up, again screaming into your mic. The 100 feet of RG-8X will attenuate your 40-meter signal by 1.0 dB, so about 80 watts will reach the antenna. However, because your antenna is not perfectly matched to the transmission line, part of the power (energy per unit time) is *reflected* back from the antenna, and part of it is sent into the air. So, just how much of that power is reflected, and how much is sent into the air? The equation that

Brass Tacks

continued

relates the reflected power to the forward power, due to SWR, is as follows:

$$\frac{P_r}{P_f} = \left(\frac{SWR-1}{SWR+1}\right)^2$$

P_r = (80 watts)[(5.4 - 1)/(5.4 + 1)]^2 = 38 watts

That 38 watts will be sent back in the coax to your transceiver, meaning 80 watts — 38 watts = 42 watts will be radiated into space. The coax will again attenuate the 38-watt signal by 1.0 dB, making about 30 watts that will return to your transceiver. Your transceiver will therefore momentarily experience 100 watts + 30 watts = 130 watts in signal strength, and if your transceiver was manufactured with a final (final output transistor or circuitry) that was designed to handle up to 120 watts, that will likely spell the end of its life.

Then again, most modern transceivers are designed with what's known as a *fold-back* circuit, which causes the transmitter to reduce its output signal strength to something around 5 watts, if it detects a return wattage that exceeds a predefined threshold. If the fold-back circuitry responds fast enough, it'll reduce the transmitter power before any serious damage is done to your finals. But relying on the speed of the circuit can be an expensive chance to take, so it's probably better to reduce the reflected power to your transceiver instead.

The mismatched case, but with a tuner

Your transceiver is connected by two feet of 50-ohm RG-8X coax to a tuner. The other end of the tuner is connected by 100 feet of the same model coax to a *poorly tuned* 40-meter antenna, such that its SWR is about 5.4:1 within that band. You activate your tuner, and match your antenna to your feed line, so that the tuner presents the transceiver with an impedance of 50 ohms, resulting in an SWR of close to 1.0:1, and presents your antenna with an impedance that's a *complex conjugate* of that presented by your antenna.

Manual tuner

You set your transceiver to transmit at 100 watts, and key up, again screaming into your mic. The two feet of RG-8X will not attenuate your 40-meter signal much, so nearly all 100 watts will reach the tuner. And because the tuner presents the transceiver with a 50-ohm impedance, there will be *no signal reflected by the tuner back to the transceiver*, but will be completely passed to the antenna side of the tuner. The 100 feet of RG-8X will attenuate your 40-meter signal by 1.0 dB, so about 80 watts will reach the antenna. However, because your antenna is not perfectly matched to the transmission line, part of the power is reflected back from the antenna, and part of it is sent into the air. Once again, 38 watts will be reflected by the antenna, of which 30 watts will return to your tuner and 42 watts will be radiated.

Now for the interesting part. When the 30 watts reaches the tuner, the 5.4:1 SWR still exists between the transmission line and the tuner, the tuner will normally reflect 14 watts back to the antenna, and absorb the 30 watts — 14 watts = 16 watts not reflected. However, the alternating frequency of the reflecting signal between the tuner and the antenna will actually cause

Brass Tacks

continued

the transmission line (coax) to transform its own impedance to that of the two end points; that is, the antenna and the tuner! The result is that, instead of the signal reflecting off the antenna, because the transmission line now matches the antenna, the remaining 80 watts will now be radiated from the antenna. This means that if the transmission line had no loss, all 100 watts would be transmitted out of the antenna. This is why many have used *ladder-line* for a feedline in the past: it has probably the lowest loss of all feedline types, close to 0 dB.

If the tuner had absorbed any of the power (indeed, it cannot, because it has no resistive components, except its wires), it would become warm, but tuners remain fairly cool, even during long contests on mismatched bands. And because all of the transmitter power (of a continuous signal, not just a pulse) is eventually emitted from the antenna, the tuner won't receive any net reflected power from the antenna in the first place.

Due to the signal interaction between the tuner and the antenna, however, the signal will suffer excessive loss if the tuner is located a significant distance from the antenna by coaxial cable. This is why you should *install your tuner as close to your antenna as possible*.

What a tuner tunes

So, why do we call a tuner a *tuner*? What exactly does it *tune*? Imagine an antenna that you've purchased or built. Also imagine that your antenna requires some sort of matching section, such as a gamma match or a hairpin match or toroidal 4:1 balun, or window line in the case of a G5RV antenna. The purpose of that matching section is to make your 200-ohm or 450-ohm antenna appear to the transceiver like it's a 50-ohm antenna.

Automatic ("auto") tuner

What's the difference between that matching section and a tuner? Nothing, except that most tuners are adjustable, and even some matching sections are too. The purpose is the same: they *tune your antenna*, or in other words, they make your antenna impedance appear close to the feedline (coax) characteristic impedance, allowing for *maximum power transfer* from your rig to the antenna.

Some are concerned about a tuner's insertion loss, or the power lost as a result of the device being inserted into your antenna system. For many tuners, the insertion loss is fairly small, around 0.5 dB or less, which amounts to less than 11 %. And if you're using coaxial cable for your feedline, you're typically going to experience a lot more loss by your cable than by your tuner.

References

For further study and much greater technical depth on the role of tuners, I refer you to the website *The Myth of Reflected Power* by Davide Achilli IZ2UUF and to the website *How Does a Tuner…Tune?* by Davide Achilli IZ2UUF and to the book *Another Look at Reflections* by M. Walter Maxwell W2DU. Davide's material used with permission. I also recommend the Wikipedia reference on tuners.

Noji Ratzlaff, KNØJI (kn0ji@arrl.net)

Dear Annette

What's on your mind? Serious, humorous, technical, and thoughtful answers to your deepest, (mostly) ham-related questions.

Dear Annette:

If I key up (and ID) on a repeater, but hear nothing in response, does that mean the repeater is not operational?

Todd in Herriman

Dear Todd:

The last issue of the *UVARC Shack* (Sept 2019) featured an article about repeater fundamentals. If you followed all the guidelines listed (frequency, offset, shift direction, and tone), and you feel you're within range of the target repeater, it's very possible that the repeater is not up and running at the moment. Then again, some repeaters have a very short *squelch tail* or no courtesy beep, so without another ham to answer your call, it might be difficult to know. Another thing you can try is to use two radios, both set for the repeater. When you transmit on one (because you're sending a signal to the repeater input), you might be able to hear yourself on the other (because you're receiving a signal from the repeater output.) The only problem with that experiment, however, is the likelihood of *desense* (desensitization), which you can overcome by separating your radios a hundred or more feet from each other.

Dear Annette:

Why does ham radio require a license?

George in Orem

Dear George:

The federal government has licensed all aspects of the radio frequency spectrum since it began regulating its allocation. Today, the FCC has set several frequency bands apart from the rest as *unlicensed*, imposing strict limitations with regard to bandwidth, antenna, power level, and equipment certification. On one hand, amateur radio is a service in which many of these restrictions are waived or given a lot more latitude, to allow for innovative experimentation. On the other hand, along with this lenience comes responsibility, and the FCC has found that the best way (so far) to ensure a level of responsibility is by licensing.

Dear Annette:

Are we allowed to put ham radio license plates on trailers?

Carl in American Fork

Dear Carl:

According to the current Application for Personalized Plates, you are indeed permitted to install amateur radio license plates on trailers. *By the way, all personalized license plates require an annual renewal fee, except Amateur Radio, Search and Rescue Radio, and Purple Heart plates.*

Dear Annette:

What ham equipment should I take with me when hiking the back-country?

Daffy in Price

Dear Daffy:

I use a Baofeng UV-5XP, along with a battery case filled with alkaline batteries, and

N9TAX roll-up antenna

Smiley half-wave telescopic antenna

Pigtail adapter cable

Use the telescopic antenna when you're hiking and using the Wilderness Protocol. Use the roll-up antenna when you stop and want to reach out a little farther.

Got a question for Dear Annette*? Email it to* ***uvarcshack@gmail.com*** *and include your town name. Sorry, no guarantees.*

The Amateur in You, Part 1

What have you been pondering?

Role of the ERC

The Church of Jesus Christ of Latter-day Saints has established a world-wide communication network they call the *ERC* (Emergency Response Communications), whose purpose is to provide basic communication to gather information during times of widespread disaster. This network, while global in scope, extends down into the area, stake, and ward levels as well.

How it's organized

Under the direction of the Stake President, each stake establishes a communication plan, led by the High Councilor assigned to Welfare. He can further designate a Stake Emergency Communication Specialist to organize the communication side of the Stake Emergency Preparedness Plan. Ideally, that Stake Specialist is a licensed ham, who designates a Stake Net Manager to organize a regular stake net.

In each ward, the Bishop designates a Ward Emergency Preparedness Specialist, who establishes a Ward Communication Plan, including members who have radio gear who can help out if the need for emergency communication arises. This radio gear is not limited to only amateur, but also includes FRS, GMRS, CB, MURS, and cell phone text messaging.

The weekly ERC net

To aid in training this army of radio communication volunteers, the Church has established a regular ERC net in many Bishops' Storehouses around the US, plus in some other countries. In Utah County, the LDS Church ERC net is organized by the Lindon Bishops' Storehouse, and hosts an amateur radio net each Tuesday (except the first Tuesday) at 8:00 pm on the 147.020+ MHz (100.0 Hz tone) repeater. On the first Tuesday of each month, the net is held on 147.020 MHz simplex. *Any person with an amateur radio license is welcome to check into that net*, but the net is organized primarily to train those with ward and stake communication callings.

During the course of each weekly net, the ERC also hosts a *training topic* that addresses one aspect of amateur communication within the ERC structure. These topics help you understand the role communication plays in disaster preparedness, and your role in using the ERC to help your family, your ward, and your stake.

The ERC in action

During an actual emergency or even a simulated incident (such as a drill), the ERC activates its net on its repeater, and invites all amateurs to check into the net, if they wish to do so. Besides communicating with your city and your ARES (Amateur Radio Emergency Service) group, you can also communicate your well-being with the ERC, and obtain situation information from them as well.

Be sure to check in with your Block Captain, report your well-being to the City, and then check in to the ERC net in progress.

As mentioned, your stake should have a weekly net for the ham operators in your stake to check into, for training and to promote familiarity with amateur protocol. So, do you? If your stake holds a regular net, it might be listed on the stake net website. If it's not, then ask your stake leaders to start one. If they don't start one, you're fully authorized to start one yourself, but call it an Area net, not a Stake net, because you won't be properly representing the LDS Church. You can see a list of things you can do, to start your own net, on the New Ham website. Then, tell us about your net!

The Amateur in You, Part 2

What have you been pondering?

Avoiding the geezer complex

When people think of the word *geezer*, they tend to envision an elderly male who's one toy short of a Happy Meal. In the amateur radio world, being a geezer has little to do with gender or age, and is defined more by attitude, behavior, and insecurity, but this article will use the pronoun "he" out of sheer laziness.

Just what is a geezer?

A geezer is a person who has a lot of experience at something, and tends to believe the way he has performed or accomplished that activity is *the only way* to do it, so that a change or deviation from that method is just plain wrong. Here are some symptoms that can clue you in to the fact that a person is in fact a geezer:

- many of his QSOs are long-winded, filled with re-living the past
- he jumps to conclusions without considering all the facts, such as assuming a ham is unintelligent when the ham asks a relatively basic question, or comes on the air with a mild speech impediment
- he's quick to criticize and correct others on the air, and refuses to acknowledge his own mistakes
- when another asks how he knows something, instead of providing useful information, he states that he has superior knowledge, and begins quoting his lengthy résumé, which might list thirty years of military service and forty years as a ham operator, starting as a teen who had to learn Morse code by candle light
- he bristles at changes in technology, saying that he and computers don't get along, and that digital modes have no place in ham radio
- he bristles at changes
- he criticizes any use of Chinese radios, smartphones, and / or non-ITU phonetics
- he'll sometimes start a response with, "Well, back in *my* day, …"
- he is often negative, or often portrays a sour attitude, or often complains on the air about a variety of things
- he might use (even mildly) abusive words regarding his spouse or others on the air

You get the idea...the bottom line is that a geezer is a ham who is like concrete: a little mixed up, but set in his ways. He tends to be inflexible, wordy, and unwilling to learn or accept anything new.

That being said, it's ok to retrieve from a lifetime of learning, and to look back on those years with fondness...you deserve it, and you've earned the right. If you are a person who has many good years of great experience to draw from, the rest of us honor you and value your input and judgment. You have a permanent place in the ham radio world, and we welcome your contributions.

Be the helpful ham

So, how does one avoid becoming a geezer? Accept new ideas, embrace change, be open to suggestion and correction, understand that you don't know everything there is to know about a subject, and be the helpful ham, ready to provide good information in brief, thoughtful answers. If somebody questions something you've gleaned from your many years of valuable experience, try and understand what the person is really trying to ask or learn.

Who knows? Some day you might need to ask a helpful ham to return the favor. :-)

Hot Tips

Good info for the new ham, and old stuff to refresh your memory

Setting up a remote station

Along with many others, you're interested in setting up an amateur station when traveling far outside of cell phone coverage and out of the reach of most repeaters. Your goal is typically the ability to reach a loved one, another ham, or help, in a moment of need. But yours is a special circumstance, because while it's *possible* to communicate by amateur radio on just about any band and by almost any mode, many setups are more *practical* than others.

Non-amateur solutions

Satellite phone has proven to be a reliable communication method away from civilization, but its subscription, phone rental, and setup costs are quite prohibitive to the average person. Some day satellite technology will bring us inexpensive internet from the sky, but until then, amateur radio is about all we have.

License upgrade

Since we're focused now on an amateur radio solution, you basically have two options: VHF repeaters or skywave over HF. In order to reach a distant repeater, you might need to use a directional antenna, like a Yagi, but assuming you aren't able to reach one at all, HF communication is your remaining option.

On HF frequencies, you can communicate by CW (Morse code) or some other mode. If you're not into CW, and you have a Technician class license, you'll need to upgrade to General in order to use other modes, such as SSB (single sideband). **Keep in mind that the distant person you communicate with also needs to hold a General class license.**

Required equipment

You're going to need an HF transceiver, one that allows two-way communication on at least the 80-, 40-, and 20-meter bands, which most do. You'll also need a tuner, to make sure you're getting the greatest available signal out your antenna. Many modern transceivers have tuners built into them. Finally, you'll need a power supply, but assuming AC power is either less-than-abundant or non-existent, you can rely on battery power for your needs.

Spares are also a good idea, as in, coax, connectors, antennas, and maybe everything.

Your antenna

Your HF antenna will be your key. I recommend using a fan or other multi-band dipole, instead of a vertical or beam (Yagi) antenna. The dipole is easy to install, and will help with nearby (within 400 miles) communication, while the others are designed for distant contacts, due to their low takeoff angles. Mount your dipole less than ¼-wavelength above ground, to produce an NVIS effect.

Power

Last, but most importantly, your supply of energy will be your greatest radio station need. Go ahead and bring your hefty generator, but that should be your backup, not primary, electrical energy source, because you probably won't have an infinite fuel supply out there.

At an outpost like yours, a solar panel can be worth its weight in gold. The goal of using solar should be to use the energy supplied by your batteries, then rely on your panels to continually charge them through an MPPT-type charge controller. Your batteries should be *deep-cycle*, and provide enough Ah (amp-hours) to supply all your electrical needs when your radio is on. Then, you'll need to complement that with solar panels that can supply enough power to completely recharge all your batteries in one day.

Noji Ratzlaff, KNØJI (kn0ji@arrl.net)

DIY

Worthwhile projects you can build on your own

6-meter vertical dipole antenna

Due to a couple of regular local nets, and the fact that we've finally reached past the bottom of the sunspot cycle minimum, we're starting to see a resurgence of interest in 6 meters, especially for SSB (single sideband). This project is nearly identical to the roll-up 20-meter antenna I showcased last year (*UVARC Shack*, September 2018), but for 6 meters.

The roll-up dipole is very portable, and when mounted, is less than ten feet long. Also, instead of being centered within the entire 6-meter band, this antenna will favor the lower end of the band, where SSB is likely to be used. I hung my antenna from a tree limb with paracord through one of the ¼˝ stud ring terminals, and secured the ring terminal on the other end by paracord to a ground stake. This resulted in my antenna being center-fed by the coax, which wasn't a problem, since the center was only six feet above the dirt, an easy reach.

Parts list:

10 feet of 18 AWG speaker wire (5 feet of the pair)
5 inches of 2.0 mm heat shrink tubing
1 2.5 mm X 8 mm flathead, beveled machine screw
1 2.5 mm X 0.45 mm nut
1 BNC (female) solder bulkhead connector
1 16 AWG ring terminal for #4 stud
2 16 AWG ring terminal for ¼" stud
1 2.5 mm flat washer
1 2.5 mm lock (split) washer
1 BNC male-to-SO-239 adapter

BNC female solder bulkhead

speaker wire

ring terminals

BNC / SO-239 adapter

First, I started by calculating how long my wires should be. Using the typical frequency-to-feet conversion formula for a quarter-wavelength, I figured that each element (side) should be

234 / 50.200 MHz = 4.67 feet, or 4 feet 8 inches

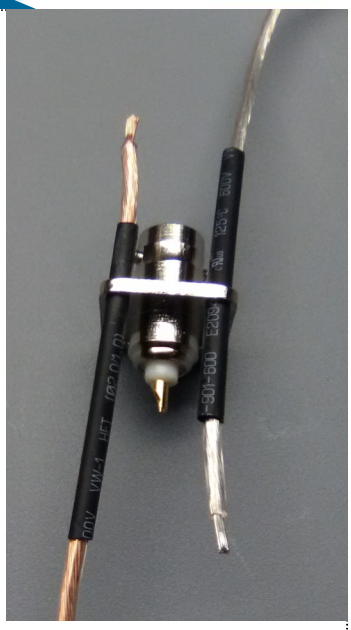
But taking the wire's velocity factor (0.95) into account, the actual length should be closer to

4.67 feet X 0.95 = 4.44 feet, or 4 feet 5 inches

DIY, continued

6-meter vertical dipole antenna

Construction



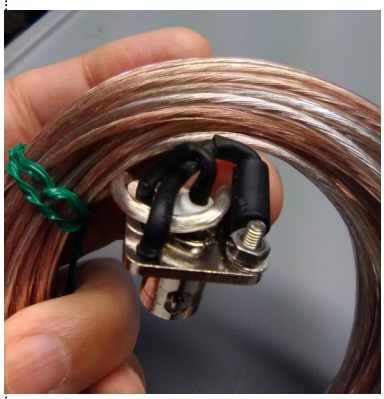
First, I carefully ripped the speaker wire pair down the middle to separate the two halves. Then, I slipped a 1″ piece of the 2-mm heat shrink tubing over each of the separated wire lengths, a couple of inches from the end of the wire, and stripped about ¼″ of insulation off each end. Next, I threaded each wire, along with its tubing, through one of the mounting holes of the bulkhead to relieve the strain on the wire against its connecting joints. In the end, the shrink tubing is applied more for protecting the wire insulation from cutting by the sharp mounting holes.

Next, I soldered one of the wires to the center solder pin of the connector, and shrank the tubing over the soldered connection. For the other wire, I soldered a ring terminal for #4 stud, then mounted it to one of the free holes of the bulkhead using a 2-mm bolt, nut, and split washer, then shrank its tubing as well.

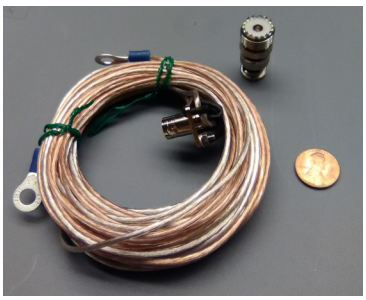
I measured and cut each wire 4 feet 5 inches (4 feet 4 inches after tuning) from the bulkhead, then applied Super Glue to connect the wire to a ring terminal for a ¼″ stud. The ring terminal is only used as a mounting hook, so that I can stretch out the dipole in a vertical configuration. The glue allows for a strong, non-electrical connection between the wire and the terminal.

Testing the finished product

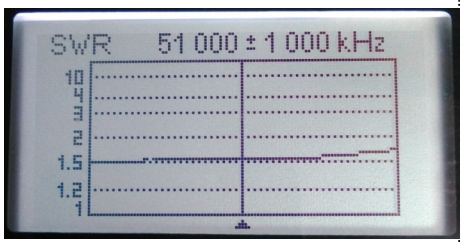
To test the antenna, I connected a BNC-to-SO-239 adapter, then stretched it across some 6-foot-tall garden stakes I had in my garage. Ignoring the proximity to the Earth, I hooked it up through some coax to my antenna analyzer, and was pleased with the results. The center frequency showed an acceptable SWR (about 1.5:1), skewed more toward the lower-end of the 6-meter band. And this is what I wanted, because that's the end where most SSB traffic takes place. Next step: take this little gem up to the mountains to chase some DX when the sunspots decide to return.



Finished detail



Compact roll-up size

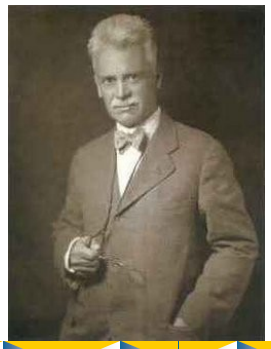


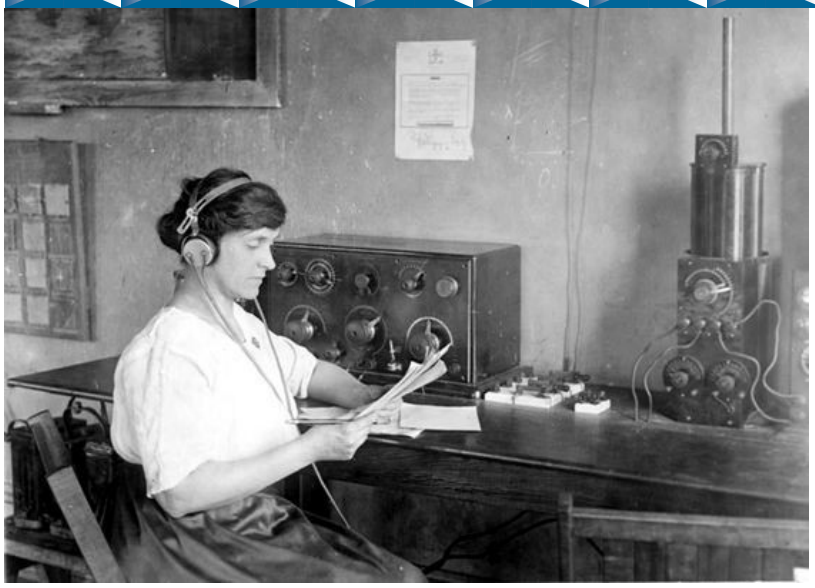
Not perfect, but not bad

Noji Ratzlaff, KNØJI (kn0ji@arrl.net)

Living in the Past

Historical perspective





One of the few women radio engineers in the 1920s, Mary Loomis opened a radio and engineering school

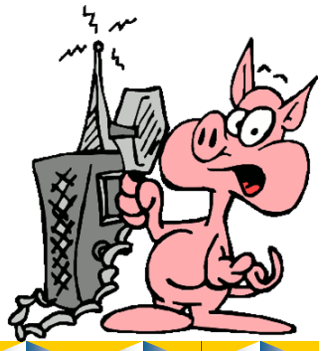
In 1925, Rufus Turner was the first black radio licensee at age 17, and later created one of the world's first transistor radios

Jarmilia Hermanova in 1930, the first Czech female amateur

Kathleen Parkin designed and built her own radios, and got licensed in 1916 at the ripe age of 15

Side of Bacon

A little ham humor



In tents

They Cost more ~but they Do more

ZENITH RADIO

For Instant Contact—Faster Action depend on

Motorola 2-way Radio

RELIABILITY

—top quality components plus years-ahead design give you communications you can depend upon—always!

Uninterrupted communications—24 hours a day—are vital to modern fire fighting. That's why Motorola systems, famed for 'round-the-clock dependability, are first choice of 75% of the radio-equipped fire departments.

Better parts, years-ahead design, and precision workmanship guarantee the kind of performance firemen have learned to expect from Motorola equipment. Eight exclusive Motorola improvements give you time-tested durability . . . lowest overall maintenance. The Motorola "Permakay" wave filter eliminates 15 nuisance tuning adjustments *forever!* Let an experienced Motorola engineer in your vicinity give you the complete Motorola 2-way Radio story *soon!*

For details, write Dept. 2286—FE today!

national Motorola RADIO COMMUNICATIONS service

Motorola Communications & Electronics, Inc.

The trend is to MORE and MORE MOTOROLA 2-way RADIO

2 new JOBS

1—Crystal controlled Xmitter, in unit form. The units you have been waiting for — Buy the units you need.

2—75 watt Hartley Xmitter — assembled kit — $52.50. All parts assembled in place, wiring completes the set.

CRYSTAL CONTROLLED UNITS

Comprising: Crystal oscillator, doubler or amplifier, output amplifier stages for coupling to the antenna. Component parts of each unit are best quality available, carefully designed and constructed. Coils can be supplied for 20, 40 or 80 meters. *Specify choice when ordering.*

Unit	Price Assembled Kits	Wired and Tested
Xtall. Oscillator, uses 210 tube	$23.50	$28.50
Amp. or Doubler, uses 210 tube	23.50	28.50
Output Stage (with Ant. coil and Ant. meter), uses 210 tube	40.00	47.50
Output 50 W. stage (with Ant. coil and Ant. meter)	52.50	65.00
Output 75 W. stage (with Ant. coil and Ant. meter)	57.50	70.00

Units may be purchased separately

75 WATT TRANSMITTER

Popular layout. This type of design permits an unusually low price for a 75-watt transmitter, although constructed of the finest materials. You will recognize the Cardwell condensers and many other well known parts in the illustration at the left. Coils can be supplied for 20, 40 or 80 meters. *Specify choice when ordering.*

Watts	Price Assembled Kits	Wired and Tested
75 watt	$52.50	$65.00
75-watt Push Pull	65.00	80.00
7.5 watt	32.50	40.00

Power supply 2000-volt 250 M.A. wired and tested — $67.50. For use with the 75-watt or 75-watt Push Pull transmitter. These transmitters are equipped with Jewell meters, Cardwell condensers, Ward Leonard leaks.

5-METER PHONE-KIT, SEE COVER AUGUST *QST*—$20.00

All New National S. W. Receivers in Stock

ALUMINUM SHIELD CANS assembled with slotted corner pieces. Special sizes to order

Height	Width	Length	Price
5"	5"	5"	$1.00
6"	5"	9"	1.85
6"	7"	9"	2.25
7"	6"	10"	2.45
7"	8"	10"	2.75
7"	6"	14"	3.25
7"	7"	12"	2.95
7"	8"	14"	3.95

SHEET ALUMINUM cut absolutely square to any size specified.

Thickness	Price
1/32"	6/10c per sq. in.
1/16"	7/10c per sq. in.
3/32"	3/4c per sq. in.
1/8"	1c per sq. in.
3/16"	1½c per sq. in.
1/4"	2c per sq. in.

RESISTORS Grid Leaks and Bleeders (All special Ward Leonard Resistors — 200 watt)

5,000 ohm — For 204-A Grid Leak	$1.95
10,000 ohm — 50 Watter Grid Leak	2.25
15,000 ohm	2.50
30,000 ohm	2.70*
30,000 ohm — For use on supply up to 750 volts	2.85*
50,000 ohm — For use on supply up to 1000 volts	3.25
60,000 ohm	3.25
80,000 ohm — Double units 1500 volt supply	4.85
100,000 ohm — Double units 1500 volt supply	5.25

* For use as grid leak on 852.

10,000 ohm 40 watt resistor for 210 . . . $.90
200 W. units 8¼" long with brackets.

COPPER TUBING inductances Wound and ends drilled FREE

Inside dia.	3/16"	1/4"	5/16"
1½"	8c turn	9c turn	
2"	9c turn	10c turn	12c turn
2½"	9c turn	10c turn	15c turn
3"	10c turn	12c turn	17c turn

MONITORS (Gross)

Gives foolproof check on note and stability. Hear your signal as the other fellow does. Aluminum case, completely shielded and self-contained batteries. With A and B batteries for 230 or 199 tubes.

Price (Less Tubes) $10.50

QUARTZ CRYSTALS, 80 meter band 4.95

QUARTZ CRYSTALS, 40 meter band 9.95

CRYSTAL HOLDERS 2.50

SOCKETS, 50 Watt, Limited Stock. 1.00

R. F. XMITTER CHOKES 60

GROSS 866 RECTIFIERS, Unconditional Guarantee 5.00

FILAMENT TRANSFORMERS Center Tapped

These husky transformers are built to stand the gaff.

Voltage	Rating	Price
1-7½	7 Amps	$4.35
2-7½	4 Amps each	6.25
3-7½	5 Amps each	7.50
2½	10 Amps	4.35
	10,000 v. insulation	
10	7½ Amps	5.65

SPECIAL TRANSMITTERS AND RECEIVERS CONSTRUCTED. Any type job built to your own specifications.

No. 12 Solid Enamel antenna wire, per 100 ft. . . . . $.90

No. 10 Solid Enamel antenna wire, per 100 ft. 1.40

No. 18 Rubber covered stranded hookup wire on spool, 100 ft. 90

.5 mfd. 300 v. bi-pass condensers, very compact 30

8-inch Fleron Porcelain Insulators 30

CARDWELL TRANSMITTING TYPE CONDENSERS

Type	Capacity	Price
T-183	.00011	$6.85
164-B	.00022	5.45
T-199	.00033	6.85
147-B	.00044	6.85

FREE ADVICE ON RADIO PROBLEMS *Write Jerry Gross*

FREE CODE CLASS

Here is an opportunity to learn the code or speed up free. This will be supervised by a leading commercial operator, write or call for dope.

Gross RADIO

25 WARREN STREET, NEW YORK CITY

Complete Line of Standard and "Hard to Get" Parts

Say You Saw It in *QST* — It Identifies You and Helps *QST* 61

For Your Insight

Information you could use

Club meeting format

Here's the usual agenda for club meetings, at the Orem City Council Chamber Room, 56 N State St:

Talk-in frequency on the club repeaters

6:30 pm : Eyeball QSO

socialize / put faces with call signs

radio programmers available to help you

6:45 pm : Call the meeting to order

meeting lineup (agenda)

announcements / nets / awards / calendar

7:00 pm : Discussion / breakout session

discussions usually involve everybody

breakouts split into separate groups

7:45 pm : Door prizes

7:55 pm : Dismiss and disassemble

8:00 pm : *Club QSY* to a local eatery

Something you'd like to see at the meetings?

Monthly meeting help

We're grateful for the volunteers who help with various tasks that make our club night just that much more friendly and useful to everybody. Monthly we need help with

programming radios (thanks, Loren / Ralph / Mickey!)

taking photos or videos during the meeting

operating the talk-in radio

setting up tables and chairs (thanks, Heath!)

Lynx

Websites for your education and leisure

Training items and topics for nets

Ham Radio Nets

Radio programming

76ers Group and UVARC Group pages

Utah Ham Radio Exam Schedule

Send your input to ***uvarcshack@gmail.com***

Questions of the Month

Test your knowledge (answers next page)

G8BØ6 : What is the total bandwidth of an FM phone transmission having 5 kHz deviation and 3 kHz modulating frequency??

A. 3 kHz

B. 5 kHz

C. 8 kHz

D. 16 kHz

E6F11 : What is the approximate open-circuit voltage produced by a fully-illuminated silicon photovoltaic cell?

A. 0.1 V

B. 0.5 V

C. 1.5 V

D. 12 V

Calendar

What's happening
(times are Mountain Time)

Utah County Ham Exam Sessions

BYU J. Reuben Clark Law School building

Sign up at HamStudy.org/sessions

Sat November 16, 2:30 to 5:00 pm
Wed November 20, 7:00 to 8:45 pm
Wed December 18, 7:00 to 8:45 pm
Sat December 21, 2:30 to 5:00 pm
Wed January 15, 7:00 to 8:45 pm
Sat January 18, 2:30 to 5:00 pm
Sat February 15, 2:30 to 5:00 pm
Wed February 19, 7:00 to 8:45 pm

Provo One-day Technician Courses*

Third Saturday Monthly at 8:00 am
BYU Law School Bldg, First Floor
* *except May, June, July, and August*

2020 Orem Ham Radio Courses

Technician : Tue 21, 28 Jan, 04, 11 Feb
Extra : Tue 10, 17, 24, 31 Mar, 07 Apr
General : Tue 21, 28 Jul, 04, 11 Aug
Technician : Tue 22, 29 Sep, 06, 13 Oct

Club Meeting Calendar (6:30 pm)

Orem Council Chambers, 56 N State St

November 7	December 5*
January 2	February 6
March 5	April 2
May 7	June 4
July 16*	August 6

** Actually a potluck at 25 N Main St, Lindon*

Regular Nets

RACES Net, Thu 17 Dec 8:00 pm, 147.12
Jackson Hole Net, Mon 8:00 pm, 146.76
UVARC Ladies' Net, Tue 7:00 pm, 146.78
UARC 76'ers, Wed 7:00 pm, 146.76
UVARC Family Net, Thu 6:30 pm, 146.78
UVARC New Ham Net, Thu 7:00 pm, 146.78
CERT Net, 2nd & 4th Thu 8:00 pm, 146.78
Utah County 6 meters, Fri 8:00 pm, 50.14
6-Pack Net, Fri 9:00 pm, 50.15
Family History Net, Sat 8:00 pm, 146.78
See a larger list of nets at noji.com/nets

Upcoming Contests

State QSO Parties
NV, AZ, PA, SD : 12 Oct, NY, IL : 19 Oct

CQ Worldwide DX Contest
6 pm Fri Oct 25 to 6 pm Sun Oct 27

Japan International DX Contest
Midnight Sat 09 Nov to 6 am Sun 10 Nov

ARRL November Sweepstakes
2 pm Sat Nov 16 to 8 pm Sun Nov 17

See a larger list at noji.com/contest

Answers to the Questions of the Month

G8BØ6 : **D** (16 kHz) [(5 kHz + 3 kHz) x 2 = 16 kHz]

E6F11 : **B** (0.5 V)

Vendors

For your convenience

Pockrus Joystick J-pole

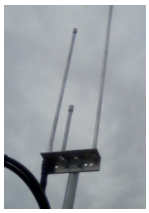
$25, open-stub aluminum half-wave, dual-band J-pole antenna

$35, 6-meter dipole, $20 for the 220 MHz (1.25 m) antenna

by Carl Pockrus, WE7OMG (email myjpoles@gmail.com to purchase)

Half-wave performance, solid construction, weather-proof, low wind-load

Probably the best-performing outdoor antenna you can get for the price



Super-Elastic Signal Stick

$20, vertical quarter-wave flexible antenna

by Richard Bateman, KD7BBC, of *SignalStuff* (and maker of *HamStudy*)

Super-performing antenna for your HT (handhold transceiver)

Visit SignalStuff and select SMA-Male, SMA-Female, or BNC

Ham Radio Podcasts v1.50

by Trevor Holyoak, AD7GH (email android@holyoak.com)

Stream podcasts (such as *100 Watts and a Wire*, *Amateur Radio Newsline*, *ARRL Audio News*, etc.) or download for later listening

For Android 4.1 and up (ad-free available for purchase)

Club Logo and Call Sign Embroidering

Want your call sign or name (or both!) embroidered on your shirt, your hoodie, your duffle? Or how about a club patch with your call sign?

by Glenna Gardner, WE7SEW (glenna0354@gmail.com or text 801-592-2503)

Call sign or name = $5, Both = $8, UVARC patch = $5, Patch with call = $9

Portable Aluminum J-pole

$49, sectioned, open-stub aluminum half-wave, dual-band J-pole antenna

by Stan, KJ7BDV and Kent, N7EKF (email skantenna@yahoo.com for info or call 801-372-7260)

Complete antenna breaks down into a compact 2″ x 6″ x 12″ package weighing only 3 lbs, perfect for backpacking and portable work where you really need a good 2-meter antenna

HamBadgers

Amateur radio name badges and other products

$10, official UVARC ham radio name badge with the club logo

Visit Ham Badgers and select Ham Radio Clubs > Utah Valley Amateur Radio Club

Email Eric Palmatier at hambadgers@gmail,com or call 919-249-8704

Where everybody knows your call sign

Utah Valley Amateur Radio Club
Orem, Utah, USA

K7UVA
Phone/Text: 801-368-1865
Email: k7uva@arrl.net

Repeaters: 146.780–, 100.0
448.200–, 100.0 224.560–, 100.0
145.250-, 100.0 448.225-, 100.0
Newsletter input?
Email uvarcshack@gmail.com
Need help?
Email uvarcelmer@gmail.com

We're on the web!
uvarc.club

We are the *Utah Valley Amateur Radio Club*, a 501(c)(3) non-profit (EIN 81-360-6416) Utah corporation that was organized in an obscure Orem fire station on 02-05-2016 to provide amateur radio enthusiasts in Utah County and surrounding areas a way to gather and discuss all things ham. Our primary purposes are to provide a local amateur radio resource, help new hams in their new-found adventures, and to give more experienced hams a reason to share their wealth of knowledge and wisdom in a friendly atmosphere of fellowship. We're an ARRL Affiliate and work in cooperation with the Utah VHF Society, but are not subsidiary to them, to UARC, the 76ers, UCARES, RACES, the SCATeam, or any other organization, although many of our members and leaders might also belong to the same.

This newsletter is copyrighted and published by the Utah Valley Amateur Radio Club, and its purpose is to convey the tone and temperament of the club, to inform and entertain its members, and to entice the rest. To join, go to uvarc.club/join, then sign up at www.facebook.com/groups/uvarc/ to stay informed. For more information about our club or about amateur (ham) radio in general, please email or text or call us.

More than just a club, we invite you to become part of a great ham radio movement in Utah Valley

Our fearless leadership

Presidency

President..... Noji Ratzlaff
Vice President..... Chad Buttars
Secretary.....Caryn Alarcon
Activities..... Wendy Shoop
Technology.....Trevor Holyoak

Board of Directors

Richard Bateman, KD7BBC
Carl Pockrus, WE7OMG
Aubrey Gum, K7GUM
Jeff McGrath, N1SC
Jody Dollar, K7BUX
Jeremy Giovannoni, K7TEH
Brad Kirk, AF7FP
Alma Perry, W1ZGY
Loren Chandler, WB1KE
James Brown, W7JHB

Club Sponsor

Heath Stevenson
Orem City Emergency Manager

From all of us to you, 73